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DIV. OF WATER & LAND DEVELOPMENT

December 20, 1990

Mr. Duane Kanuha
Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kanuha:

As required in the County of Hawaii Planning Commission's geothermal resources permit (GRP 89-1), we have enclosed five (5) copies each of the November, 1990 monthly report.

If you have any questions, please call me at 522-5620.

Sincerely,

Harry Olson
Hawaiian Electric Industries/
Spark Matsunaga Fellow in
Geothermal Energy Research

Enclosure: November monthly report

NOVEMBER 1990 MONTHLY REPORT

Scientific Observation Hole (SOH) Program

Geothermal Resource Permit: GRP 89-1

Lilewa, Kapoho, and Halekamahina, Hawaii

TMK: 1-2-10:01; 1-4-01:02; and 1-4-02:32

Hawaii Natural Energy Institute

University of Hawaii

December 1990

SUMMARY

Drilling continued at SOH 1, throughout the month of November, 1990. At the beginning of the month the depth of the hole was at 4181 feet and the ending depth was 4653 feet, an interval of 472 feet. Drilling this month was again impeded by poor drilling conditions. The rock was hard and highly fractured, with prevalent caving, resulting in numerous redrills. However, at approximately 4,500 feet, the formation changed from fractured and broken, dense, fine grained submarine volcanics and dike rock to clastic material ranging from rock fragments several inches in diameter to bedded silt and clay. Core runs improved in this area, but dropped again between the interval of 4,572 to 4,621 feet. Below 4,621 feet, the submarine flows became competent permitting 4-8 foot core runs with fairly solid core. SOH 2 was granted a grading and grubbing permit on December 4 and preparation for the site is scheduled for early next year. SOH 3 remains in the permitting stage awaiting a grading and grubbing permit. The burial of the sump material at SOH 4 is scheduled for early January, 1991.

I. INTRODUCTION

This document presents a monthly report to the County of Hawaii Planning Department to support the Scientific Observation Hole (SOH) program in the Kilauea middle and lower east rift zones. The SOHs are for scientific observation purposes only. The holes will not be flow-tested or produced. The information to be gained from the SOHs will provide an assessment of subsurface geological conditions, groundwater level and composition, temperature, drilling conditions, an inventory of possible mineral and geothermal resources, and an eruptive history of the island to the the depth drilled.

This report addresses: occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility; performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed; and emission measurements.

II. BACKGROUND

The County of Hawaii Planning Commission approved, on August 8, 1989, a geothermal resource permit application (GRP 89-1) to drill scientific observation Holes (SOHs) in the Kilauea middle and lower east rift zone. This document presents a monthly report, as required in condition 6:

"The petitioner shall maintain a record in a permanent form suitable for inspection and five (5) copies shall be filed with the Planning Department on a monthly basis during drilling and for six (6) months after the completion of drilling to establish a hole specific baseline and such record shall be available to the community. The record shall include:

- a. Occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility.
- b. Performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed.
- c. Emission measurements reported in units compatible with applicable standards/guidelines."

As designated, four holes are planned to be drilled along the Kilauea East Rift Zone on the Big Island of Hawaii. Three of the Big Island holes (SOHs 1, 2, and 4) are on agriculture land and have been permitted by the County of Hawaii Planning Commission. The fourth hole, designated SOH 3, is on

conservation land. SOH activities under Conservation District Use Permit (HA 12/20/85 - 1830) issued to the Estate of James Campbell have been approved.

III. SOH 1 SITE

Drilling Activity

Tonto drilling services continued drilling activities to a depth of 4723 feet for this reporting period. The drilling penetration rate and bit life has improved, but continues to remain low due to difficult drilling conditions, including highly fractured rock, caving problems and core barrel blockage.

Monitoring Program - Air Quality

The air quality monitoring station provides a continuous record of atmospheric H₂S concentrations when interfaced with a data logger or chart recorder. The unit is located in a utility container on-site and power is provided by the drill rig system.

The optics system of this station was completely overhauled, recalibrated and rebalanced on November 19. There was some data loss from November 25 to 27 caused by a generator breakdown on the drill rig, but on the whole this station operated normally with routine calibrations. Total data capture was 91% (see Appendix for details).

Monitoring Program - Meteorological

Continuous wind speed and directional measurements are being

made with a recording wind speed/direction sensor system. A data logger and back-up pressure-sensitive recorder is being used to record the wind speed and direction data. The unit is located in a utility container on-site and power is provided by the drill rig system.

This station operated normally except for the data loss caused by the generator on the Drill Rig. Calibrations were stable. Total data capture was 91% (see Appendix for details).

Monitoring Program - Noise

One noise monitoring station is located at the SOH 1 site during drilling. This station operated normally for the majority of the month with only minor loss of data due to the generator failure Nov. 25-27 and a faulty power connection on Nov. 28. Repairs have been made and station is fully operational.

A second noise station is located at the Laughlin residence, about a quarter mile west of SOH 1 drill site. This station operated normally throughout the month with full calibration.

A third noise monitoring station is installed at the Pommerenk's residence, about a mile east of the SOH 1 site. This monitor is powered by solar charged batteries, which required minor adjustments this month. Instrument malfunction due to moisture from recent heavy rains produced some inconsistent results. The instrument was removed for service on two occasions, but now seems to be fully operational.

Emissions Reports

An H₂S monitor is located on-site. The average H₂S level measured is about 1 ppb. The Colortek sensors show no indication of any emissions from the well.

IV. SOH 2 SITE

No drilling activity has been initiated. Ambient noise monitoring is being prepared for the SOH 2 site. Findings of the flora/fauna field surveys have been sent to County of Hawaii Planning Department. A permit (3801-01) has been granted by the Department of Land and Natural Resources to inspect, modify, and if practical, install a pump into an existing airstrip well to supply water for drilling operations. The start-of-construction date for the assessment of the well has been extended from October 25, 1990 to April 25, 1991. A grading and grubbing permit for this site was approved on December 4 and plans are being made to prepare the site early in the coming year.

V. SOH 3 SITE

No drilling activity has been initiated. Access to the SOH 3 site has not been constructed, nor has the site been cleared or graded. SOH 3 is scheduled to be located at the True/Mid-Pacific alternate drill site 2 (approximately 3,000 feet north-north-west of the present drill site). All necessary reports have been submitted to DLNR for review and approval. Archeological Consultants of Hawaii, Inc., have been contacted to perform the necessary archaeological survey and have meet with a

representative of the Division of Historic Preservation in order to define the specific elements of the research design in relation to possible burial sites and lava tubes. DLNR is still considering a medicinal plant survey to be undertaken and submitted before the issuing of a grading and grubbing permit.

VI. SOH 4 SITE

Drilling Activity

Drilling completed -- no activity for this period. County of Hawaii landfill officials found the mud pit material unsuitable (too wet) for their operations; therefore, Department of Health officials have given approval to bury the material on-site, which will be scheduled early January. Planting of ohia seedlings (from DLNR nursery) will follow soon after.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions are not being monitored, since drilling has been completed at this site.

APPENDIX
MAINTENANCE REPORTS

ALPHA MICROSYSTEMS

1550 Akolea Place
Hilo, Hawaii 96720
(808) 935-7985

HAWAII NATURAL ENERGY INSTITUTE
Look Laboratory
811 Olomehane St.
Honolulu, Hawaii, 96813

Attn: Ms. Laura Glenn

December 6, 1990

Dear Ms. Glen,

This report covers the period Nov. 1, to Nov. 30, 1990.

GILMAN HAI. This instrument operated normally throughout November. There was a minor 2 hour power outage on Nov. 19 and calibrations required only minor corrections. Total data capture was 99%.

SOX-1 HAI. The Optics system was completely overhauled, recalibrated and rebalanced on Nov. 19. There was data loss on Nov. 25, 26, and 27 caused by a generator breakdown on the Drill Rig. With that exception, this analyzer operated normally during the month and calibrations were routine. Total data capture was 91%.

WOODS HAI. There was a data loss of 12 hours on Nov. 2 because of a Lead Acetate tape jam and a 2 hour loss on Nov. 12 due to a power outage. The air-sample pump was replaced on Nov. 30, but caused no data loss. Routine calibrations during the month were consistent and needed very little correction. Total data capture was 98%.

WOODS MET. The overall picture of this station indicates increasingly severe problems. The Relative Humidity Sensor has been inoperative for a number of months. The Wind Direction Sensor has become increasingly unstable recently but may continue to function till the end of the year. The Temperature Sensor has also become unstable with periods of invalid output causing data loss. This sensor may give 50% valid data to Dec. 31. There has also been substantial data loss during November due to severe weather (23 inches of rain were recorded even with the station inoperative for about 3 day during the height of the storm. Total data capture for this station (excluding RH) was about 82% despite problems.

T.P. MET. This station also suffered severe problems during November but the problems were weather related rather than instrument or sensor failures. The severe moisture problems due to continuous rain caused the Chart paper to stick and jam. A few hours of data were offset by many hours of inoperation. Total data capture was only 67%.

SOH-1 MET. This station operated normally during the month of November except for the data loss caused by the generator failure on the Drill Rig. Calibrations were stable. There was a data loss of 62 hours on Nov. 25,26,27 from this cause for a total data capture of 91%.

COLORTEC. The colortec cards were replaced weekly as a matter of routine and showed no visible color change. The local cockroaches however, seem to have developed an appetite for the Lead Acetate detector on the cards.

Enclosed:

H2S Data Reduction for Gilman, SOH-4 and Woods Stations
For November 1990.

Average, Maximum and total H2S for the above stations.

Meteorological Data Reduction for Woods, T.P., and SOH-1.
November 1990.

Synopsis of Woods and T.P. Met Data for November, 1990.

Copy of Station Logs, November, 1990.

November Invoice

Supplementary Billing

		LABOR	PARTS
J-309	Monday, 11-5-90 SOH-1 Operating normally. Replaced pen. POMERINCK Operating normally. Checked batteries LOUGHLIN Operating normally. No problems.	2.00	
J-311	Wednesday, 11-7-90 SOH-1 Operating normally. POMERINCK Operating normally. Installed and calibrated the newly repaired sound meter, and returned the borrowed meter to SAIC. Exchanged batteries and checked solar panel. LOUGHLIN Operating normally. Chart and pen O.K.	3.00	109.20
J-311	Friday, 11-9-90 Reviewed all SOH and all ORMAT stations in company of Ron Darby and Kim Born. SOH-1 Operating normally. Full calibration. Minor adjustments. POMERINCK Operating normally. Full calibration. Minor adjustments. LOUGHLIN Operating normally. Full calibration. Minor adjustments. COLORTEC Replaced colortec cards. No color change visible.	4.00	
J-314	Monday, 11-12-90 SOH-1 Operating normally POMERINCK Operating normally LOUGHLIN Operating normally	2.00	
J-316	Wednesday, 11-14-90 SOH-1 Operating normally but accidentally left meter set at 60-120 db range instead of 40-100, so some data lost when noise level was less than 60db. POMERINCK Most data for past 48 hours O.K., but meter behaving very erratically. Believe cause to be moisture. Very heavy rain...batteries about flat. Took station out of service temporarily. LOUGHLIN Operating normally	2.00	

J-318	Friday, 11-16-90	3.00
	SOH-1	
	Operating normally. Ran full calibration.	
	POMERINCK	
	Replaced microphone and pre-amplifier at sound meter to restore normal operation. Batteries up again.	
	LOUGHLIN	
	Operating normally. Full calibration.	
	COLORTEC	
	Replaced colortec cards. No color change visible.	
J-323	Monday, 11-19-90	2.00
	SOH-1	
	Operating normally. Replaced pen.	
	POMERINCK	
	Inoperative. Chart jammed, batteries low. Removed instruments for repair. Moisture problems.	
	LOUGHLIN	
	Operating normally.	
J-325	Wednesday, 11-21-90	2.00
	SOH-1	
	Operating normally. Replaced pen again.	
	POMERINCK	
	Replaced repaired instruments.	
	LOUGHLIN	
	Operating normally. Replaced pen.	
J-327	Friday, 11-23-90	3.00
	SOH-1	
	Operating normally. Full calibration	
	POMERINCK	
	Operating normally. Full Calibration	
	LOUGHLIN	
	Operating normally. Full calibration	
	COLORTEK	
	Replaced colortec cards. No visible color change.	
J-330	Monday, 11-26-90	2.00
	SOH-1	
	Inoperative due to generator breakdown. Lost data.	
	POMERINCK	
	Inoperative. Chart jammed, batteries very low.	
	Took off line to charge batteries.	
	LOUGHLIN	
	Operating normally. No problems.	

J-332 Wednesday, 11-28-90 2.00
SOH-1
 Inoperative. Faulty power connection. Repaired power
 line and placed back in operation.
POMERINCK
 Inoperative. Batteries charged somewhat, Placed back
 in operation.
LOUGHLIN
 Operating normally. No problems.

J-334 Friday, 11-30-90 3.00
SOH-1
 Chart jam. Lost some data. Full Calibration.
POMERINCK
 Operating normally. Replaced main battery, ran
 full calibration, renewed chart.
LOUGHLIN
 Operating normally. Full calibration. Renewed
 chart.
COLORTEC
 Replaced colortec cards. No visible color change.

J-306 Friday 11-2-70

Woods HAIRange ϕ - 1 ppb

*

Inoperative - some data lost - Replaced Blown fuse
 Flow set to 3.0, Renewed Chart, Lead Acetate OK
 Drained Tygon - Filled Bubbles - Pump OK.
 Check Steady @ 21.8%

Optics - Did not Adjust - will have to stabilize

Range - High, 2 ppb High, adj. for 1:1 Low, 1:1

Zero Calib 33 4 3 1 ϕ

Span Calib - Exp	50	50	50	50	(did not adjust) (wait to stabilize)
Act	22	38	48	51	

Woods Met

Operating Normally - Renewed Chart

TP Met

Operating Normally - Replaced Chart - Batt OK @ 12:44

SOH-1 Met

Operating Normally - Renewed Chart

Edman HAIRange ϕ - 2 ppb

Flow adj. to 3.0 from 3.1, Renewed Chart, Lead Acetate OK
 Tygon Dry - Pump + Bubbles OK

Check 17.9%, up .1%

Optics Steady @ 2010-2010

Range - High 1:1 Low 1:1

Zero Calib 17 1 2 ϕ SOH-1 HAIRange ϕ - 1 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate OK
 Tygon Dry - Pump + Bubbles OK

Check 28.6%, up .3%

Optics 2270-2290, adj. to 2290-2290

Range - High 1:1 Low 1:1

Zero Calib 27 8 3 1 ϕ Colortec

Replaced Colortec Cords - No color change visible

J-309 Monday 11-5-90

Woods HAI

Range 0-3ppb

Flow Steady @ 3.0, chaut O.K. - Replaced lead Acetate

Tygon Dry - Pump + Bubbler O.K.

Check 21.9%, up .1%

Optics 1620-1590, down 30^m, adj. to 1590-1590

Range - High 1.1 Low 1.1

Zero Calib 2L 5 -0 (^{5ppb} 1/4 left) 0Woods Met

Operating Normally - chaut O.K.

T.P. Met

Operating Normally - chaut + Batt O.K.

SON-1 Met

Operating Normally - chaut O.K.

Elman HAI

Range 0-3ppb

Flow Steady @ 3.0, chaut O.K. - Replaced lead Acetate

Tygon Dry - Filled Bubbler - Pump O.K.

Check 17.7%, down .2%

Optics 2020-2010, down 10^m, No adj.

Range - High 1.1 Low 1.1

Zero Calib 12 5 3 2

Span Calib - Exp 50 50 50 50 (^{5ppb} 1/2 right) 50 50
Act 28 40 47 48 (^{1/2 right}) 49 50SON-1 HAI

Range 0-2ppb

Flow Steady @ 3.0, chaut O.K. - Replaced lead Acetate

Tygon Dry - Pump + Bubbler O.K.

Check 28.4%, down .2%

Optics Steady @ 2280-2280

Range - High 1.1 Low 1.1

Zero Calib 26 ± 1 1 0

J-311 Wednesday 11-7-90

Woods HAIRange ϕ -4ppb

Flow steady @ 3.0, Renewed Chart - Tape O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 20.9%, down 1%, Adj Span Pot 1/4 left

Optics 1600-1620, up 20 μ , adj T₂ 1620-1620

Range - High 1.1 Low 1.1

Zero Calib 19 10 \pm ϕ Woods Met

Operating Normally - Chart O.K.

TP Met

Operating Normally - Chart + B.H. O.K.

SOH-1 Met

Operating Normally - Renewed Chart

Gilman HAIRange ϕ -3ppb

Flow steady @ 3.0, Renewed Chart - Tape O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 18.1%, up .4%

Optics 2020-2050, up 30 μ , adj T₂ 2050-2050

Range - High 1.1 Low 1.1

Zero Calib 18 3 \pm ϕ SOH1-HAIRange ϕ -3ppb

Flow steady @ 3.0, Renewed Chart, Tape O.K.

Tygon Dry - Filled Bubbler - Pump O.K.

Check 28.6%, up .1%

Optics steady @ 2290-2290

Range - High 1.1 Low 1.1

Zero Calib 26 4 \pm ϕ

J-313 Friday 11-9-90

Woods HAIRange ϕ -3

Flow steady @ 3.0, chart & Tape OK

Tygon Dry - Pump + Bubbler OK

Check steady @ 20.9%

Optics 1620-1610, down 10 μ , No Adj.

Range - High 1:1 Low 1:1

Zero Calib 20 4 0 0

Woods Met

Rain Gauge Tipped Over - Rebalanced - Renewed Chart

J.R. Met

Operating Normally - Renewed Chart - Bath OK

50H-1 Met

Operating Normally - Replaced Chart

Exilman HAIRange ϕ -2 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 18.0%, down .1%

Optics steady @ 2250-2250

Range - High 1:1 Low 1:1

Zero Calib 17 5 3 0 0

50H-1 HAIRange ϕ -2 ppb

Flow steady @ 3.0, chart + Tape OK

Tygon Dry - Pump + Bubbler OK

Check 26.4%, down .2%

Optics 2290-2280, down 10 μ , No Adj.

Range - High 1:1 Low 1:1

Zero Calib 27 11 2 1 0

Span Calib - Exp 50 50 50 50 50

Act 24 30 47 49 50

Colantec

Replaced Colantec cards - No Apparent Colon change.

J-316 Monday 11-12-90

Heavy Rain

Woods HAI

Range 0 - 3ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 21.0%, up .1%

Optics 1620-1610, down 10-20 No Adj.

Range - High 1:1 Low 1:1

Zero Calib 19 5 2 0

Too Wet for Span Calibration

Woods Met

Operating Normally - Chart OK

T.P. Met

Operating Normally - Chart + Cell OK

SON-1 Met

Operating Normally - Chart OK

Bilman HAI

Range 0 - 2ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 17.8%, down .2%

Optics 2060 - 2030, down 30-20, adj to 2030-2030

Range - High 1:1 Low 1:1

Zero Calib 0 2 2 0

SON-1 HAI

Range 0 - 2ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check steady @ 28.4%

Optics steady @ 2290-2290

Range - High 1:1 Low 1:1

Zero Calib 24 2 1 0

Woods J-318 Wednesday 11-14-90

Woods HAI

Range 0-2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check steady @ 21.0%

Optics steady @ 1630-1630

Range - High 1.1 Low 1.1

Zero Calib 15 4 0 1 0

Woods Met

Operating Normally - chart OK

T.P. Met

Operating Normally - chart & Bath OK

SON-1 Met

Operating Normally - Renewed Chart

Gilman HAI

Range 0-2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 22.5%, up .1%

Optics steady @ 2220-2220

Range - High 1.1 Low 1.1

Zero Calib 26 9 3 0

SON-1 HAI

Range 0-2 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 17.5%, down .3%

Optics 2040-2020, down 20, Adj to 2020-2020

Range - High 1.1 Low 1.1

Zero Calib 6 1 2 0 0

J-320 Friday 11-16-90

Woods Met IRange ϕ - 2 ppb

Flow steady @ 3.0, chart & lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check steady @ 21.0%

Optics 1830-1620, down 10 μ , No Adj.

Range - High 1:1 Low 1:1

Zero Calib 14 4 1 ϕ Woods Met

Some data loss to chart problems (wet) Replaced chart

T.P. Met

Chart jammed due to moisture - data loss - Repaired

SOH-I Met

Operating normally - chart OK

Gilman HAIRange ϕ - 2 ppb

Flow steady @ 3.0, chart & lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 18.6%, up 1.1%

Optics 2030-2050, up 20 μ , adj. to 2050-2050

Range - High 1:1 Low 1:1

Zero Calib 8 15 3 1 1 (2 zero pt) ϕ

Span Calib - Exp 50 50 50 50 50

Act 53 45 49 49 50

SOH-I HAIRange ϕ - 2 ppb

Flow steady @ 3.0, chart & lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 28.8%, up .2%

Optics steady @ 2290-2290

Range - High 1:1 Low 1:1

Zero Calib 28 8 2 ϕ Colortec

Replaced Colortec cards - No visible color change

J-323 Monday 11-18-90

Woods HAI

Range ϕ - 2ppb

Flow steady @ 3.0, chart OK, Replaced lead Acetate
Tygon Dry - Pump & Bubbles OK

Check 24.8%, up 3.8%

Optics 1620-1640, up 20 μ , adj. to 1640-1640

Range - High 1:1 Low 1:1

Zero Calib 20 50 \pm ϕ ϕ

Woods Met

All normal except Temp. - chart OK

T.P. Met

Operating Normally - chart & Ref OK

SON-1 Met

Operating Normally - chart OK

Silmon HAI

Range ϕ - 2ppb

Flow steady @ 3.0, Replaced chart - Replaced lead Acetate

Tygon Dry - Filled Bubbles - Pump OK

Check 21.7%, up 3.1% - Adj Cycle time $\frac{1}{2}$ sec.

Optics 2060-2020, down 40 μ , adj. to 2030-2030

Range - High 1:1 Low 1:1

Zero Calib 10 5 3 ϕ ϕ

SON-1 HAI

Range ϕ - 2ppb

Flow steady @ 3.0, chart OK - Replaced lead Acetate

Drained Tygon - Pump & Bubbles OK

Check 33.7%, up 4.9%, - Span Pot 1 Left

Optics - out of tolerance - Rebalanced System to 2530-2550

Range - High 1:1 Low 1:1

Zero Calib 20 4 0 1 ϕ

Span Calib Exp 50 50 50 50 (span Pot) 50

Act 29 38 49 52 (1 Left) 50

J-325 Wednesday 11-21-90

Woods HAI

Range 0 - 2 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Filled Bubbler - Pump O.K.

Check 21.1%, down 3.7%

Optics 1640-1660, up 20 m, adj. to 1660-1660

Range - High 1:1 Low 1:1

Zero Calib 18 6 2 1 0

Woods Met

Operating Normally - Chart O.K.

T.P. Met

Chart Jammed - Last 2 Hours - Repaired

SOH-1 Met

Operating Normally - Renewed Chart

Gilman HAI

Range 0 - 2 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 19.2%, down 2.5%

Optics 2020-2070, up 50 m, adj. to 2070-2070

Range - High 1:1 Low 1:1

Zero Calib 18 7 3 1 0

SOH-1 HAI

Range - 0 - 2 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 27.4%, down 6.3%

Optics 2310-2320, up 10 m, adj. to 2320-2320

Range - High 1:1 Low 1:1

Zero Calib 23 5 1 0

J-327 Friday 11-23-90

Woods HAIRange ϕ - 2ppb

Flow steady @ 3.0, Replaced Chart - Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 21.2%, up .1%

Optics 1650-1630, down 20 m, adj to 1630-1630

Range - High 1:1 Low 1:1

Zero Calib 23 4 2 1 ϕ

Span calib - exp 50 50 50 50 50

Act 28 39 45 49 50

} No Adj.

Woods Met

*

Chart Jammed - lost 48 Hours - Renewed Chart

TP MetChart Jammed - lost ? Hours - Relubed Chart Recorder and
Adjusted Chart Tension - Renewed ChartSOH-1 Met

operating Normally - Chart OK

Galman HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart & Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check steady @ 19.2%

Optics 2070-2020, down 50 m, adj to 2030-2030

Range - High 1:1 Low 1:1

Zero Calib 14 3 ϕ - ϕ ϕ SOH-1 HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart & Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 27.5%, up .1%

Optics steady @ 2330-2330

Range - High 1:1 Low 1:1

Zero Calib 25 2 2 ϕ Colony

Replaced Colony cards - No visible color change.

Note - Cockroaches eating the Lead Acetate

J-330 Monday 11-26-70

Woods HATRange ϕ -2ppb

Flow steady @ 3.0 Chant + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 20.7%, down .2%

Optics 1660-1650, down 10-m, No Adj.

Range - High 1:1 Low 1:1

Zero Calib 36 8 1 0 0

Woods Met

Operating Normally - Chant OK

T.P. Met

Operating Normally - Chant OK, Replaced Battery

SOH-1 Met* ~~Oper~~ Inoperative No Power since Sunday Morn - to be Restored this Afternoon.Gilman HATRange ϕ -2ppb

Flow steady @ 3.0 Chant + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 19.0%, down .2%

Optics 2030-2060, up 30-m, adj to 2060-2060

Range - High 1:1 Low 1:1

Zero Calib 16 5 1 0

Span Calib - Exp 50 50 50 50 (span Pot) 50
Adj 33 42 42 49 1/4 Right 50SOH-1 HAT

* Inoperative - No Power - Generator Breakdown - Power to be Restored this Afternoon.

J-332 Wednesday 11-28-90

Woods NAI

Range 0 - 2 pph

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 20.7%, down .2%

Optics 1660-1630, down 30 m, Adj. to 1630-1630

Range- High 1:1 Low 1:1

Zero Calib 20 5 2 1 1

Woods Met

Operating Normally - Chart O.K.

I.P. Met

Operating Normally - Chart + Bubbler O.K.

SOH-1 Met

Operating Normally - Renewed Chart

Gilman NAI

Range 0 - 2 pph

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Filled Bubbler - Pump ~~not~~ O.K.

Check 18.6%, down .4%

Optics 2050-2080, up 30 m, adj. to 2080-2080

Range- High 1:1 Low 1:1

Zero Calib 12 6 3 0 0

SOH-1 NAI

Range 0 - 2 pph

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 25.6%

Optics 2270-2240, down 30 m, adj. to 2240-2240

Range- High 1:1 Low 1:1

Zero Calib 24 7 3 0

J-134 Friday 11-30-90

Woods HAI

Range 0-3 ppb

Flow Steady @ 3.0, chart + lead Acetate OK

Tygon Dry - Pump & Bubbles OK

Check Steady @ 20.7%

Optics 1630-1620, down 10 μ , Adj to 1620-1620

Range - High 1.1 Low 1.1

Zero Calib 18 2 3 1 0

Woods Met

Operating Normally - Renewed Chart

1st Met

Operating Normally - Renewed Chart Batt OK @ 12:16

SOH-1 Met

Operating Normally - Chart OK

Gilman HAI

Range 0-2 ppb

Flow Weak - Chart + lead Acetate OK

* Tygon Dry - Replaced Pump - Bubbles OK

Check 18.1%, down .5%

Optics 2080-2040, down 40 μ , adj to 2040-2040

Range - High 1.1 Low 1.1

Zero Calib 12 6 -0 0

SOH-1 HAI

Range 0-2 ppb

Flow Steady @ 3.0, Replaced Chart, lead Acetate OK

Drained Tygon - Filtered Bubbles - Pump OK

Check 25.1%, down .5%

Optics Steady @ 2250-2250

Range - High 1.1 Low 1.1

Zero Calib 24 2 1 1 0

Span Calib - exp	50	50	50	50	(span Pot)	50
Act	19	36	48	51	(1st Let)	50

Colortec

Replaced Colortec Cards - No visible Color Change

STATION LOG

J-309 Monday, 11-5-90
 SOH-1 0840 Clouds 95% WS&DIR 280 @ 3-4
 Operating normally. Replaced pen (3 days)
 POMERINCK 0905 Clouds 90% WS&DIR 290 @ 4-5
 Operating normally. Checked batteries.
 LOUGHLIN 9035 Clouds 90% WS&DIR 290 @ 3-4
 Operating normally.

J-311 Wednesday, 11-7-90
 SOH-1 0835 Clouds 100% WS&DIR 45 @ 2-3
 Operating normally. No problems
 POMERINCK 0910 Clouds 95% WS&DIR Calm
 Operating normally. Installed newly repaired sound
 meter. Ran full calibration, exchanged batteries.
 LOUGHLIN 0948 Clouds 90% WS&DIR 125 @ 3-4
 Operating normally. Chart & pen O.K.

J-313 Friday, 11-9-90
 SOH-1 1050 Clouds 10% WS&DIR 60 @ 2-3
 Operating normally. Replaced pen and ran full
 calibration. Adjusted meter to 110.0 from 109.7 db.
 No adjustments to chart recorder. Pulled chart and
 gave to Ron Darby.
 POMERINCK 1400 Clouds 10% WS&DIR 110 @ 4-5
 Operating normally. Replaced pan and ran full
 calibration. No adjustments required for either
 meter or recorder. Pulled chart and gave to Darby.
 LOUGHLIN 1015 Clouds 10% WS&DIR 90 @ 2-3
 Operating normally. Replaced pen and ran full
 calibration. Adjusted meter to 110.0 from 110.7 and
 adjusted recorder down 2 db. Pulled chart and gave
 to Ron Darby.

J-316 Monday, 11-12-90
 SOH-1 0900 Clouds 100%, rain WS&DIR 105 @ 2-3
 Operating normally. Replaced pen.
 POMERINCK 0920 Clouds 100%, rain WS&DIR 170 @ 2-3
 Operating normally. Replaced pen.
 LOUGHLIN 0940 Clouds 100%, rain WS&DIR 160 @ 2-3
 Operating normally. Chart & pen O.K.

J-318 Wednesday, 11-14-90
 SOH-1 0900 Clouds 100%, rain WS&DIR 90 @ 3-4
 Operating normally but sound meter was accidentally
 set on 60 to 120 db range instead of 40 to 100. Some
 data was lost when the sound level was below 60 db.
 POMERINCK 0920 Clouds 100%, rain WS&DIR 110 @ 5-6
 Very erratic. Unable to get a steady trace. Believe
 this to be caused by excessive moisture. Also batteries
 very low. Not enough sun to charge. Shut down station.
 LOUGHLIN 1000 Clouds 100%, rain WS&DIR 95 @ 7-8
 Operating normally. Chart & pen O.K.

J-320 Friday, 11-16-90
 SOH-1 0945 Clouds 100%, rain WS&DIR 130 @ 3-4
 Operating normally. Full calibration. Adjusted meter to 110.0 from 109.3. Recorder was 3 db down. adjusted.
 POMERINCK 0830-0930 Clouds 100%, light rain WS&DIR 90 @ 3-4
 Batteries charged up a little. Replaced microphone and pre-amp on sound recorder to restore operation. Chart paper damp enough to get a blurred trace. Reset chart speed to 5 cm/hr to get a useable trace. Full calibration. Adjusted meter to 110.0 from 110.2. No recorder adjustment.
 LOUGHLIN 1010 Clouds 95% WS&DIR Calm
 Operating normally. Full calibration. Adjusted meter to 110.0 from 110.6. Recorder was O.K., chart and pen O.K.

J-323 Monday, 11-19-90
 SOH-1 0820 Clouds 100% WS&DIR 90 @ 4-6
 Operating O.K. Replaced pen
 POMERINCK 0845 Clouds 100% WS&DIR 110 @ 8-10
 Inoperative...Chart jammed, batteries low. Turned station off. Removed meter & recorder for repair. Moisture problem.
 LOUGHLIN 0928 Clouds 100% WS&DIR 95 @ 3-4
 Operating normally.

J-325 Wednesday, 11-21-90
 SOH-1 0840 Clouds 100%, rain WS&DIR 135 @ 4-6
 Operating normally. Replaced pen again. (2 days)
 POMERINCK 0910 Clouds 100% WS&DIR 120 @ 4-6
 Replaced dried-out meter and recorder. Tested O.K. Placed back on-line.
 LOUGHLIN 1105 Clouds 100%, rain WS&DIR 90 @ 4-5
 Operating normally. Replaced pen.

J-327 Friday, 11-23-90
 SOH-1 0845 Clouds 100%, rain WS&DIR 195 @ 5-6
 Operating normally. Replaced pen again. (2 days)
 Full calibration but no adjustments required for either meter or recorder.
 POMERINCK 0940 Clouds 100% WS&DIR 180 @ 6-8
 Operating normally. Full calibration. No adjustments were required.
 LOUGHLIN 1015 Clouds 100% WS&DIR 190 @ 6-8
 Operating normally. Full Calibration. No adjustments were required.

J-330 Monday, 11-26-90
 SOH-1 0815 Clouds 80% WS&DIR Calm
 Inoperative. Chart jammed, battery dead, pen dry. No power since Sunday morning due to generator failure. Power to be restored this afternoon.
 POMERINCK 0915 Clouds 80%, haze Calm
 Inoperative. Chart jammed, batteries very low due to lack of Sun. Re-oriented station to take full advantage of any Sun to charge batteries, but took station off line to allow recharge.
 LOUGHLIN 1019 Clouds 90%, haze Calm
 Operating normally, no problems.

J-332 Wednesday, 11-28-90

SOH-1 0810 Clouds 90%, rain Calm
Inoperative. No power. Drill crew helped to restore power. Just a bad connection. Checked operation and placed back on line.

POMERINCK 0900 Clouds 90% Calm
Inoperative. Batteries charged partially only, too many clouds. Placed instruments back on line.

LOUGHLIN 0930 Clouds 100% Calm
Operating normally. No problems.

J-334 Friday, 11-30-90

SOH-1 0810 Clouds 70% WS&DIR 360 @ 3-4
Chart jammed. Lost some data. Ran full calibration. No adjustment required for meter, 1 db increase for chart recorder. Renewed chart.

POMERINCK 0920 Clouds 60% WS&DIR 315 @ 3-4
Operating normally. Renewed chart. Full calibration. Adjusted meter to 110.0 from 109.8. Adjusted chart recorder 2 db higher.

LOUGHLIN 1002 Clouds 50% WS&DIR 40 @ 3-4
Operating normally. Renewed chart. Full calibration. Adjusted meter to 110.0 from 109.7. No adjustment required for chart recorder.

DAILY AVERAGE, MAXIMUM AND TOTAL H2S READINGS

November 1 To November 30, 1990

Date	Gilman			SOH-1			Woods		
	Avg	Max	Total	Avg	Max	Total	Avg	Max	Total
1101	1	3	33	1	2	25	1	2	23
1102	2	3	36	1	2	21	1	4	16
1103	1	3	32	1	2	13	1	2	21
1104	1	3	33	0	1	11	1	3	31
1105	2	2	39	1	2	27	2	4	53
1106	2	3	41	2	3	43	2	4	55
1107	2	3	38	2	2	39	2	3	46
1108	2	3	46	1	2	19	1	2	35
1109	2	4	43	1	2	19	1	3	31
1110	2	3	40	1	2	16	1	3	32
1111	2	3	38	1	2	26	1	2	26
1112	2	3	43	1	2	32	1	2	26
1113	1	2	35	1	2	34	1	1	20
1114	1	2	32	1	2	24	1	2	31
1115	2	3	37	1	2	32	1	2	31
1116	1	2	33	1	2	32	1	2	32
1117	1	3	32	2	2	40	1	2	28
1118	1	2	33	2	2	42	1	2	24
1119	1	2	23	1	2	34	1	2	19
1120	1	2	29	2	2	29	1	2	22
1121	1	2	27	1	2	30	1	2	27
1122	1	2	31	1	2	35	1	2	33
1123	1	2	24	2	3	39	1	2	31
1124	1	2	34	1	2	32	1	2	21
1125	1	2	25	0	1	3	1	2	32
1126	1	2	24	-	-	-	1	3	27
1127	1	2	25	0	2	8	1	2	31
1128	1	3	28	1	2	28	1	2	34
1129	1	2	25	1	2	19	1	2	28
1130	1	3	29	1	2	21	2	3	45
	1	4	988	1	3	783	1	4	911

All readings are in parts per billion (ppb)

H2S CHART REDUCTION -- SOH-1 Station

From 11-1-90 to 11-30-90

HOUR:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Avg	Max	Total	
1101	0	0	0	0	0	1	1	0	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	2	25	
1102	1	1	1	1	1	1	1	1	2	0	1	1	1	1	0	1	1	1	0	0	1	1	1	1	1	2	21	
1103	0	0	0	0	1	0	0	2	0	0	1	1	1	1	1	1	2	1	1	0	0	0	0	0	1	2	13	
1104	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0	1	0	0	1	0	1	0	1	11	
1105	0	0	0	1	1	1	0	1	1	2	1	2	1	2	2	2	2	1	1	1	2	1	1	1	1	2	27	
1106	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	3	43	
1107	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	39	
1108	1	0	1	1	1	1	1	0	1	0	1	1	1	1	1	2	1	2	0	0	0	0	1	1	1	2	19	
1109	1	1	1	0	1	0	1	0	1	0	0	1	1	1	1	2	2	1	1	1	0	0	1	1	1	2	19	
1110	1	1	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	0	0	1	0	0	1	1	2	16	
1111	1	1	1	0	1	1	1	0	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2	26	
1112	0	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	2	1	2	32	
1113	1	1	1	1	1	1	1	2	1	1	2	2	2	1	1	2	2	2	2	1	2	1	2	1	1	2	34	
1114	1	1	0	0	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	0	1	2	24	
1115	0	1	1	1	2	1	1	1	2	2	2	2	1	2	2	2	1	0	1	2	1	2	1	1	1	2	32	
1116	1	1	1	0	1	2	1	1	2	2	2	2	2	1	2	2	1	1	1	2	1	1	1	1	1	2	32	
1117	2	1	2	2	1	2	2	1	2	2	2	2	2	1	2	1	1	2	2	1	1	2	2	2	2	2	40	
1118	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	42	
1119	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	34	
1120	1	1	1	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	39	
1121	2	1	1	1	1	2	2	2	1	1	2	2	2	2	1	1	1	0	0	1	1	1	1	1	1	2	30	
1122	1	1	2	1	2	2	1	1	2	1	2	2	2	2	2	2	1	1	0	1	1	2	1	2	1	2	35	
1123	2	2		1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	1	1	2	1	1	2	2	3	39	
1124	1	2	2	2	1	1	1	1	0	1	2	1	2	2	2	2	2	2	1	1	0	1	1	1	1	2	32	
1125	1	1	0	1	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	0	1	3
1126	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	0	0	0
1127	**	**	**	**	**	**	**	**	**	**	**	*	**	**	**	**	**	**	**	2	2	1	1	1	1	0	2	8
1128	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	28	
1129	0	1	0	0	0	0	1	0	1	1	2	2	1	1	1	2	1	1	1	1	0	1	1	0	1	2	19	
1130	1	0	1	1	0	1	0	0	1	1	1	1	1	1	1	1	2	2	1	0	1	1	1	1	1	2	21	

783

AVG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
MAX.	2	2	2	2	2	2	2	2	3	3	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	3

**=Power or Equip. failure: *=Calibration

Meteorology Station Log
 50H-1
 11-1-90 to 11-30-90

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1101		1102		1103		1104	
0000	35	2	170	3	275	2	280	2
0100	55	2	65	3	275	2	275	2
0200	350	2	80	2	280	2	270	2
0300	45	2	55	3	280	3	265	2
0400	50	3	60	3	140	2	265	2
0500	80	3	65	3	190	3	265	2
0600	60	3	55	2	250	2	280	2
0700	85	2	65	2	260	2	290	2
0800	115	3	80	2	285	3	280	3
0900	110	4	80	2	340	4	310	4
1000	120	5	340	3	40	5	345	4
1100	120	4	60	4	45	5	55	6
1200	125	4	45	3	40	6	50	5
1300	90	4	310	2	50	6	50	6
1400	100	4	305	2	55	6	45	5
1500	110	4	280	2	45	6	20	4
1600	120	3	310	2	25	4	25	3
1700	130	2	310	2	315	2	360	2
1800	130	2	275	2	5	2	325	2
1900	95	2	275	2	5	2	315	2
2000	80	2	280	3	285	2	350	2
2100	95	2	270	3	285	2	300	3
2200	55	2	270	3	285	2	275	2
2300	140	3	280	2	285	2	250	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1105		1106		1107		1108	
0000	260	2	280	2	50	4	90	2
0100	275	2	280	3	90	3	90	2
0200	90	3	270	3	80	3	90	2
0300	60	2	275	3	105	4	90	2
0400	180	2	270	4	95	4	90	2
0500	35	2	265	3	95	4	90	2
0600	280	2	280	3	70	3	90	2
0700	270	2	280	2	50	2	70	2
0800	275	3	280	2	85	2	35	2
0900	280	3	295	3	90	3	55	3
1000	350	3	50	3	100	4	280	2
1100	70	3	270	3	90	4	295	3
1200	70	3	270	3	100	5	50	4
1300	65	3	270	4	110	6	85	4
1400	50	5	80	2	120	5	105	3
1500	65	5	70	2	115	5	100	4
1600	70	4	85	3	120	3	110	4
1700	50	4	100	2	85	3	95	4
1800	30	3	50	2	90	2	90	3
1900	290	3	90	2	90	2	85	3
2000	280	3	80	3	90	2	80	2
2100	275	4	100	4	90	2	100	2
2200	275	3	110	5	90	2	100	2
2300	280	2	75	4	90	2	95	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1109		1110		1111		1112	
0000	105	2	85	3	150	2	125	4
0100	105	3	15	2	55	2	125	3
0200	105	3	200	2	165	2	125	3
0300	105	3	135	2	165	2	150	3
0400	105	3	100	2	165	2	150	2
0500	105	3	85	2	165	2	160	3
0600	270	3	80	2	165	2	170	4
0700	265	3	70	2	165	2	165	4
0800	260	3	90	3	160	2	170	4
0900	270	3	95	4	250	3	160	3
1000	50	3	110	5	190	3	160	3
1100	70	3	120	5	170	3	155	4
1200	75	3	115	4	125	3	135	4
1300	65	4	120	4	135	3	140	4
1400	80	4	115	4	130	5	150	3
1500	80	4	110	3	140	3	135	2
1600	90	3	110	3	145	3	85	3
1700	75	3	110	2	140	3	110	3
1800	105	2	115	2	135	3	115	4
1900	105	2	115	2	135	3	115	4
2000	105	2	125	2	135	4	95	3
2100	105	2	125	2	145	3	100	2
2200	90	2	125	2	140	4	110	3
2300	110	2	125	2	130	3	120	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1113		1114		1115		1116	
0000	130	2	25	4	45	4	90	3
0100	130	2	315	3	45	4	90	3
0200	125	3	20	4	40	3	100	3
0300	105	3	360	3	40	3	115	3
0400	120	3	45	3	35	2	65	2
0500	115	3	30	3	30	2	100	2
0600	115	2	30	4	50	5	80	3
0700	100	3	40	4	60	4	55	4
0800	105	4	20	3	55	5	20	2
0900	110	4	35	3	70	4	85	3
1000	70	5	65	4	85	5	95	3
1100	50	7	55	8	80	6	85	3
1200	40	6	60	8	60	6	90	3
1300	45	7	70	6	65	6	115	4
1400	45	6	75	6	80	6	115	3
1500	40	5	75	5	85	5	95	3
1600	35	4	55	7	90	4	100	4
1700	10	3	55	6	75	4	90	3
1800	15	3	50	6	45	4	65	2
1900	310	3	45	5	60	2	40	2
2000	315	3	60	5	70	3	25	3
2100	15	3	65	6	150	2	70	2
2200	40	4	60	5	75	3	100	2
2300	50	4	50	4	90	3	100	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1117		1118		1119		1120	
0000	80	2	110	4	340	3	115	5
0100	95	2	110	4	55	4	125	4
0200	95	2	115	4	70	5	120	4
0300	100	2	110	4	85	6	115	4
0400	130	2	110	4	80	5	115	4
0500	140	2	100	4	90	4	115	4
0600	25	2	15	3	80	4	125	5
0700	110	2	300	2	95	3	115	5
0800	130	3	270	3	100	4	115	5
0900	130	4	265	5	125	4	130	5
1000	120	3	275	3	130	5	125	5
1100	135	5	40	3	125	5	120	4
1200	130	5	60	2	115	4	130	5
1300	125	4	45	2	125	5	130	5
1400	125	4	35	2	130	4	125	4
1500	100	3	60	8	105	4	105	3
1600	110	4	65	7	120	3	100	3
1700	115	4	40	6	145	2	85	3
1800	110	4	65	6	130	2	105	4
1900	110	4	55	5	75	2	115	5
2000	120	5	10	4	80	3	110	4
2100	110	5	300	4	115	3	90	3
2200	110	5	315	3	120	4	90	2
2300	115	5	310	4	110	4	85	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1121		1122		1123		1124	
0000	95	2	120	3	175	2	175	6
0100	140	2	140	2	165	2	180	4
0200	190	2	135	2	160	2	220	3
0300	170	2	130	2	170	2	275	2
0400	175	2	125	2	175	2	310	3
0500	160	2	125	2	175	3	320	4
0600	155	2	140	2	165	4	345	4
0700	125	3	140	2	170	4	360	5
0800	120	5	135	3	165	5	355	5
0900	120	5	130	4	165	5	350	5
1000	120	5	140	4	170	6	360	5
1100	125	5	140	4	165	6	355	5
1200	225	5	145	4	160	5	345	5
1300	130	5	150	4	165	5	350	6
1400	135	5	145	5	185	4	360	4
1500	125	4	150	4	200	4	360	3
1600	115	4	150	3	335	2	320	3
1700	110	3	150	3	65	2	310	4
1800	130	3	150	3	110	2	285	5
1900	160	4	150	3	225	2	300	4
2000	120	3	160	2	255	3	285	3
2100	115	3	155	2	165	5	295	3
2200	125	3	160	3	175	5	290	3
2300	130	3	210	3	170	6	275	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1125		1126		1127		1128	
0000	270	4	-	-	-	-	175	2
0100	275	4	-	-	-	-	170	2
0200	285	3	-	-	-	-	155	2
0300	285	3	-	-	-	-	160	2
0400	-	-	-	-	-	-	165	2
0500	-	-	-	-	-	-	165	2
0600	-	-	-	-	-	-	170	2
0700	-	-	-	-	-	-	100	2
0800	-	-	-	-	-	-	140	2
0900	-	-	-	-	-	-	155	2
1000	-	-	-	-	-	-	140	3
1100	-	-	-	-	-	-	130	4
1200	-	-	-	-	-	-	125	3
1300	-	-	-	-	-	-	120	3
1400	-	-	-	-	-	-	85	3
1500	-	-	-	-	-	-	90	3
1600	-	-	-	-	-	-	95	3
1700	-	-	-	-	-	-	95	2
1800	-	-	-	-	135	2	100	2
1900	-	-	-	-	150	3	80	2
2000	-	-	-	-	155	2	65	2
2100	-	-	-	-	165	2	60	2
2200	-	-	-	-	160	2	60	2
2300	-	-	-	-	175	2	60	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1129		1130					
0000	60	2	260	2				
0100	60	2	285	2				
0200	60	2	290	3				
0300	60	2	290	2				
0400	60	2	285	2				
0500	60	2	285	2				
0600	60	2	285	2				
0700	60	2	285	2				
0800	50	2	275	3				
0900	40	3	275	3				
1000	30	4	340	3				
1100	35	4	35	3				
1200	45	5	35	5				
1300	55	5	45	6				
1400	60	5	40	4				
1500	65	5	40	3				
1600	45	3	35	3				
1700	5	2	15	2				
1800	30	5	300	2				
1900	315	2	280	2				
2000	310	2	280	2				
2100	25	2	255	2				
2200	295	2	280	2				
2300	275	2	360	2				